

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 7,377,261 B2  
APPLICATION NO. : 10/568184  
DATED : May 27, 2008  
INVENTOR(S) : Y. Sukegawa et al.

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It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

**IN THE CLAIMS**

Column 33, line 28, through column 34, line 49, the claims should read:

29. A combustion control method ~~according to claim 28, further~~ of a spark ignition engine, comprising the steps of:  
generating turbulence in an exhaust flow in an exhaust passage;  
injecting fuel directly into a combustion chamber; and  
injecting fuel in an expansion stroke in the case where a temperature of the engine is lower than a predetermined temperature.  
~~setting a time interval between a latest fuel injection initiation timing and an ignition initiation timing to 9 ms or more.~~
30. A combustion control method ~~according to claim 26, further~~ of a spark ignition engine, comprising the steps of:  
causing penetration of injected fuel spray in a direction of an ignition plug longer than that in a direction of a piston;  
in the case where a temperature of the engine is lower than a predetermined temperature, injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and  
causing ignition timing to occur immediately before a compression stroke top dead center or later.  
~~injecting fuel into an intake port;~~  
~~and in the case where the temperature of the engine is lower than the predetermined temperature, injecting fuel in an intake stroke.~~
31. A combustion control method of a spark ignition engine, comprising the steps of:  
in the case where a temperature of the engine is lower than a predetermined temperature, generating a forward longitudinal vortex in a combustion chamber;

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**IN THE CLAIMS**

- injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and  
causing ignition timing to occur immediately before a compression stroke top dead center or later.  
~~generating turbulence in an exhaust flow in an exhaust passage;~~  
~~injecting fuel directly into a combustion chamber; and~~  
~~injecting fuel in an expansion stroke in the case where a temperature of the engine is lower than a predetermined temperature.~~
32. A combustion control method of a spark ignition engine, comprising the steps of:  
causing penetration of injected fuel spray in a direction of an ignition plug longer than that in a direction of a piston;  
in the case where a temperature of the engine is lower than a predetermined temperature, generating a forward longitudinal vortex in a combustion chamber;  
injectings fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and  
causing ignition timing to occur immediately before a compression stroke top dead center or later.
33. A combustion control method ~~of a spark ignition engine~~ according to Claim 31, comprising the steps of:  
regulating the strength of a forward longitudinal vortex generated in a combustion chamber so that a magnitude of a fluctuation of engine speed or torque fluctuation is a predetermined value or less; and  
delaying ignition timing to an extent possible.  
~~in the case where a temperature of the engine is lower than a predetermined temperature, generating a forward longitudinal vortex in a combustion chamber;~~  
~~injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and~~  
~~causing ignition timing to occur immediately before a compression stroke top dead center or later.~~

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**IN THE CLAIMS**

34. A combustion control method ~~according to claim 33 of a spark ignition engine,~~ comprising the steps of:

in the case where a temperature of the engine is lower than a predetermined temperature, injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio;  
regulating an injection pressure of fuel so that a magnitude of a fluctuation of engine speed or torque fluctuation is a predetermined value or less; and  
delaying ignition timing to an extent possible.  
~~-regulating the strength of a forward longitudinal vortex generated in a combustion chamber so that a magnitude of a fluctuation of engine speed or torque fluctuation is a predetermined value or less; and~~  
~~-delaying ignition timing to an extent possible.~~

35. A combustion control method ~~of a spark ignition engine~~according to Claim 28, further comprising the steps of:

setting a time interval between a latest fuel injection initiation timing and an ignition initiation timing to 9 ms or more.  
~~-causing penetration of injected fuel spray in a direction of an ignition plug longer than that in the direction of a piston;~~  
~~-in the case where a temperature of the engine is lower than a predetermined temperature, generating a forward longitudinal vortex in a combustion chamber;~~  
~~-injecting fuel in a second half of a compression stroke so that an air-fuel ratio is in a vicinity of a theoretical air-fuel ratio; and~~  
~~-causing ignition timing to occur immediately before or later than a compression stroke top dead center.~~

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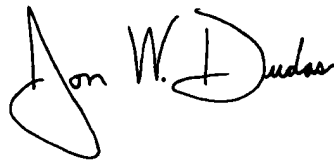
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

**IN THE CLAIMS**

36. A combustion control method ~~of a spark ignition engine, according to Claim 26,~~  
further comprising the steps of:  
    injecting fuel into an intake port; and  
    in the case where the temperature of the engine is lower than the  
    predetermined temperature, injecting fuel in an intake stroke.  
~~a second half of a compression stroke so that an air fuel ratio is in a vicinity of a~~  
~~theoretical air fuel ratio;~~  
~~regulating an injection pressure of fuel so that a magnitude of a fluctuation of~~  
~~engine speed or torque fluctuation is a predetermined value or less; and~~  
~~delaying ignition timing to an extent possible.~~

Signed and Sealed this

Second Day of September, 2008



JON W. DUDAS  
*Director of the United States Patent and Trademark Office*